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TUNG, B
EXAMINER

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ART UNIT	PAPER NUMBER
2615	3

05/26/94

DATE MAILED:

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

This application has been examined Responsive to communication filed on _____ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), _____ days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. <input checked="" type="checkbox"/> Notice of References Cited by Examiner, PTO-892.	2. <input checked="" type="checkbox"/> Notice re Patent Drawing, PTO-948.
3. <input type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449.	4. <input type="checkbox"/> Notice of Informal Patent Application, Form PTO-152.
5. <input checked="" type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474.	6. <input type="checkbox"/> _____

Part II SUMMARY OF ACTION

1. Claims 1-32 are pending in the application.

Of the above, claims _____ are withdrawn from consideration.

2. Claims _____ have been cancelled.

3. Claims _____ are allowed.

4. Claims 1-32 are rejected.

5. Claims _____ are objected to.

6. Claims _____ are subject to restriction or election requirement.

7. This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

8. Formal drawings are required in response to this Office action.

9. The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are acceptable. not acceptable (see explanation or Notice re Patent Drawing, PTO-948).

10. The proposed additional or substitute sheet(s) of drawings, filed on _____ has (have) been approved by the examiner. disapproved by the examiner (see explanation).

11. The proposed drawing correction, filed on _____, has been approved. disapproved (see explanation).

12. Acknowledgment is made of the claim for priority under U.S.C. 119. The certified copy has been received not been received been filed in parent application, serial no. _____; filed on _____

13. Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. Other

EXAMINER'S ACTION

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Title

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: "UNDERWATER IMAGING SYSTEM USING A STREAK CAMERA".

Drawings

2. This application has been filed with informal drawings which are acceptable for examination purposes only. See attached PTO FORM 948 for specific objections. Formal drawings will be required when the application is allowed.

Abstract

3. The Abstract of the Disclosure is objected to because of the following:

line 12, "optic" should be changed to "optical element". Correction is required. See M.P.E.P. § 608.01(b).

Disclosure Informalities

4. Applicant is advised that the lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

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35 U.S.C. §112, 2nd Paragraph

5. Claims 1-32 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Correction of the following is required to overcome the rejection under 35 U.S.C. §112, second paragraph:

- (1) claim 1, ln.4, "said" should be changed to "a";
- (2) claim 1, ln.5, "wide but usable" is indefinite;
- (3) claim 1, ln.10, after "imaging", "a" should be inserted;
- (4) claim 1, ln.17, before "reflected", "the" should be inserted;
- (5) claim 3, ln.3, before "reflected", "the" should be inserted;
- (6) claim 4, ln.3, "said image" lacks antecedent basis;
- (7) claim 5, ln.1, "claim" should be changed to "claims";
- (8) claim 5, ln.4, before "image", "an" should be inserted;
- (9) claim 6, ln.8-9, "said illuminated adjacent sections" lacks antecedent basis;
- (10) claim 8, ln.4, after "to", "the" should be inserted;
- (11) claim 9, ln.6, "gaussian" should be "Gaussian";
- (12) claim 10, ln.2, after "medium", "," should be deleted;
- (13) claim 10, ln.2, after "comprising", "the steps of" should be inserted;

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(14) claim 10, ln.11, after "imaging", "a" should be inserted;

(15) claim 10, ln.13, "optic" should be changed to "optical means";

(16) claim 10, ln.20, after "of", "the" should be inserted;

(17) claim 12, ln.4-5, "said reflected portions" lacks antecedent basis;

(18) claim 13, ln.3, "said image" lacks antecedent basis;

(19) claim 14, ln.1, "claim" should be changed to "claims";

(20) claim 14, ln.2, after "comprising", "the step of" should be inserted;

(21) claim 14, ln.3, after "reimaging", "an" should be inserted;

(22) claim 15, ln.3, after "of", "the" should be inserted;

(23) claim 15, ln.7, "said pulsed laser" lacks antecedent basis;

(24) claim 15, ln.8, "said illuminated adjacent sections" lacks antecedent basis;

(25) claim 16, ln.3, "said pulsed laser" lacks antecedent basis;

(26) claim 17, ln.4-5, "said pulsed laser" lacks antecedent basis;

(27) claim 17, ln.7, after "to", "the" should be inserted;

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(28) claim 18, ln.2-4, "said step of. . . turbid medium"
lacks antecedent basis;

(29) claim 18, ln.7, "gaussian" should be "Gaussian";

(30) claim 19, ln.8, "a very wide and narrow" is indefinite;

(31) claim 19, ln.37, before "reflected", "a" should be
inserted;

(32) claim 21, ln.4, before "reflected", "a" should be
inserted;

(33) claim 21, ln.7, before "scan", "a" should be inserted;

(34) claim 21, ln.7, before "system", "imaging" should be
inserted;

(35) claim 21, ln.9, before "system", "imaging" should be
inserted;

(36) claim 23, ln.7, "gaussian" should be "Gaussian";

(37) claim 24, ln.4, after "widths", "of" should be changed
to "on";

(38) claim 29, ln.11, "said variable delay" lacks antecedent
basis;

(39) claim 31, ln.3, after "viewing", "an" should be
inserted.

35 U.S.C. §103

6. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

7. Claims 1-6, 10-15, 19, 20, 24, 27, and 29-32 are rejected under 35 U.S.C. § 103 as being unpatentable over ALFANO ET AL('372) in view of KNIGHT ET AL.

ALFANO ET AL('372), as shown in Figure 6, discloses an imaging method and related system comprising: [in claims 1, 2, 6, 10, 11, 15, 19, 20, 21, 24, 30,] laser means (73) for generating a pulse beam (col.4, ln.12-13); a streak tube (89); a field-limiting slit (col.4, ln.29-30); two-dimensional detector coupled to the streak tube (col.3, ln.55-56); means for generating a volume display (col.2, ln. 23-26); [in claim 19] phosphor layer (col.4, ln.48-49); and [in claim 31, 32] display means (109).

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ALFANO ET AL does not disclose the following: [in claims 1, 4, 10, 13] cathode means; [in claims 3, 12] large aperture optical means; [in claims 5, 14] means between the field-limiting slit and the cathode; [in claims 19, 29] deflection electrodes and voltage varying means; and [in claim 27] microchannel plate means.

Streak tubes are well known in the art of turbid medium imaging and are shown to be old by KNIGHT ET AL. KNIGHT ET AL, as shown in Figure 1, teaches a streak camera for three dimensional imaging comprising cathode means (24); large aperture optical means (14); optical means in front of the cathode (col.3, ln.24-26); deflection electrodes (28) and voltage varying means (34); and microchannel plate means (30). Although ALFANO ET AL('372) does not disclose specifics about the streak camera, the various streak tube features taught by KNIGHT ET AL are certainly known in the art. Having the streak tube imaging system of ALFANO ET AL('372) and then given the teachings of KNIGHT ET AL, it would have been obvious to one of ordinary skill in the art at the time of the present invention to use a well known streak tube with the features taught by KNIGHT ET AL with the imaging system of ALFANO ET AL('372). Doing so would constitute an application of old knowledge in the art and not inventive skill.

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8. Claims 7, 8, 16, 17, 21, and 22 are rejected under 35 U.S.C. § 103 as being unpatentable over the combination of ALFANO ET AL('372) and KNIGHT ET AL as applied to claims 1-6, 10-15, 19, 20, 24-27, and 29-32 above, and further in view of TAKAOKA ET AL.

The combination of ALFANO ET AL('372) and KNIGHT ET AL substantially discloses the present invention as claimed except for: [in claims 7, 8, 16, 17, 21, 22] vehicle means providing volume scanning. TAKAOKA ET AL teaches the use of vehicle motion perpendicular to a laser pulse beam for scanning (see col.1 ln.58-63 and Fig.1) and also teaches the generation of a volume display (see col.2 ln.47-62.) Having the combination of ALFANO ET AL('372) and KNIGHT ET AL and then given the teachings of TAKAOKA ET AL, it would have been obvious to one of ordinary skill in the art to use vehicle motion as a means for determining the time dimension of volume as taught by TAKAOKA ET AL.

9. Claims 25 and 26 are rejected under 35 U.S.C. § 103 as being unpatentable over the combination of ALFANO ET AL('372) and KNIGHT ET AL as applied to claims 1-6, 10-15, 19, 20, 24-27, and 29-32 above, and further in view of YOO ET AL.

The combination of ALFANO ET AL('372) and KNIGHT ET AL substantially discloses the present invention as claimed except for: [in claims 25, 26] filter means for eliminating certain wavelengths of light. YOO ET AL teaches a streak tube imaging

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system which uses a filter means to reduce multiply scattered light (col.8, ln.60 to col.9, ln.2.) Having the combination of ALFANO ET AL('372) and KNIGHT ET AL and then given the teaching of YOO ET AL, it would have been obvious to one of ordinary skill in the art to employ a filter means for reducing the effect of multiply scattered light as taught by YOO ET AL.

10. Claims 9, 18, 23, and 28 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112, second paragraph, and to include all of the limitations of the respective base claims and any intervening claims.

11. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan S. Tung whose telephone number is (703) 308-6614.

13. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Bryan S. Tung/bst

5-11-94

~~TOMMY P. CHIN~~
SUPERVISORY PATENT EXAMINER
GROUP 2600